1. **Outline** the main health and safety responsibilities of:

a. Employers (4)

Employers:

- Generally, to ensure the health, safety and welfare of employees whilst they are at work.
- Specifically to ensure that they provide their employees with:
  - a safe place of work and a safe working environment
  - safe plant, equipment and systems of work
  - safe access and egress to and from the workplace
  - information, instruction, training and supervision
- Generally to ensure that no risk is created to non- employees, such as members of the public, as a consequence of the employer's work activities.
- To prepare a safety policy that clearly show the employers aims with regards health and safety and how he intends to achieve those aims.

b. Workers. (4)

Workers:

- Have a duty to take reasonable care of their own health and safety.
- Have a duty to take reasonable care of other people's health and safety, where they other people might be directly affected by the acts or omissions of the worker.
- Have a duty to co-operate with their employer on health and safety issues.
- Have a duty to bring serious health and safety issues to the attention of their employer.

Note that the question asks for an outline; a brief description or brief explanation; therefore, more than just a list

2. **List TWO** types of injury that may be caused by the incorrect manual handling (2)
a. of loads.

Common injuries caused as a result of manual handling are:

- Back injuries (including slipped discs and trapped nerves).
- Muscular problems - strains.
- Tendon and ligament injuries - sprains.
- Hernias - rupture of the musculature of the body cavity wall.
- Cuts, abrasions and bruising.
- Bone injuries - cracks and breaks.
- Work-related upper limb disorders (WRULDs) - these affect the soft tissues of the wrist, neck, shoulders and arm.

You only need two of the above.

b. **Outline** a good manual handling technique that could be adopted by a person required to lift a load from the ground. (6)

Good lifting technique:

- Stop and think - plan the lift.
- Position the feet slightly apart facing forward.
- Adopt a good posture with back straight and knees bent.
- Get a firm grip.
- Lift using the strong leg muscles, not the weaker back muscles.
- Keep the load close to the body.
- Don't jerk.
- Move the feet (don't twist).
- Readjust the load if necessary.

1. **Outline** the issues that are typically included in the arrangements section of a health and safety policy document. (8)

You might have included:

- Emergency procedures - fire, flood, bomb scare, substance release.
- Procedures for safe systems of work and permits-to-work.
- Procedures for risk assessment - manual handling, COSHH, VDU assessments, noise and any other risk-based procedure.
- Ill-health reporting and health surveillance.
- Accident and near-miss reporting.
- First-aid arrangements.
- Arrangements for consultation and training.
- Proactive monitoring.
- Visitor control.
- Contractor control.
- Use and selection of PPE.

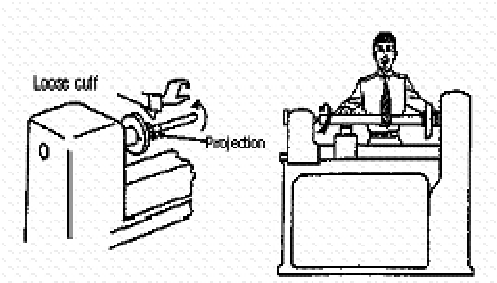
You should have picked eight topics and provided an outline for each, i.e. key features of each topic, not just a list.

2. Provide sketches to show clearly the nature of the following mechanical hazards from moving parts of machinery:

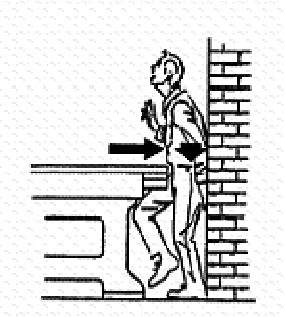
a. Entanglement.
b. Crushing (8)

You should have drawn two-dimensional sketches with labelling to show the following mechanical hazards:

Entanglement



Crushing



1. a. **Explain** the meaning of the term 'perception'. (2)

Perception can be described as the way in which the brain interprets information passed to it by the senses, or how sensory information about the world about us is translated by the brain.

For example, two people may look at the same picture, but they may see totally different things. (I look at a picture of the Mona Lisa and I see a rather depressed looking woman. An art historian sees Leonardo da Vinci at the height of his powers and all of the symbols and motifs that make him the towering colossus of the art world that he is.)

You do not need to write all of the above, just one explanation will do for the marks.

b. **Outline** the factors relating to the individual that may influence a person's perception of an occupational risk (6)

You could include an outline of the following factors:

- Age.
- Experience.
- Mental ability or intelligence.
- Disability, especially impairment of the senses.
- Attitude to H&S and to risk in particular.
- Training and education.
- Drugs and alcohol.
- Social and cultural background.

2. **Identify** the FOUR methods of heat transfer and explain how each can cause the spread of fire. (8)

The four methods of heat transfer are:

- **Conduction**

  Heat is transferred through a solid material by molecules within the material vibrating rapidly and banging into adjacent molecules more frequently. Heat is transmitted through the material in this way by direct contact. So, for example,

one end of a copper pipe may heat up in a room where there is a fire. The pipe will then get extremely hot, by conducting heat, along its entire length. Anything touching the pipe, such as a piece of paper, will also be heated up. If this takes the piece of paper above its auto-ignition temperature, then the paper will ignite and burn.

- **Convection**

  Hot air rises. So hot gases from a fire will rise upwards and will heat whatever they come into contact with. If hot gases given off by a fire rise up by convection and come into contact with a ceiling light, that ceiling light will be heated up. If it goes above its auto-ignition temperature it will ignite and burn.

- **Radiation**

  Fires give off infrared radiation. This travels in straight lines at the speed of light. If radiant heat falls onto a nearby material, it will be absorbed and will cause the material to heat up. If this heating takes the material above its auto-ignition temperature, then the material will ignite and burn. Therefore, your garden shed catches alight because of its proximity to the garden bonfire simply because of the radiant heat.

- **Direct Burning**

  If you put burning material next to other flammable material, the flame front transfers from one to the other. Therefore, burning cinders caught in the breeze get blown downwind of a forest fire, and they start secondary fires ahead of the main flame front when they land in the dry grass.

1. **Outline** the hazards that might be encountered by a gardener employed by a local authority parks department. (8)

You could include an outline of the following hazards:

- Noise from machinery such as lawnmowers, strimmers, etc.

- Mechanical hazards associated with machinery such as cutting hazards from lawnmower blades, ejected material from strimmer use, etc.
- Chemical hazards associated with pesticides and weedkillers.
- Biological agents from contact with rats' urine (Leptospirosis) or dog faeces.
- Biological agents from contact with discarded syringes (Hepatitis).
- Dust inhalation during very dry weather.
- Chemical hazards from various plants and tree sap.
- Broken glass from discarded beer bottles.
- Violence from members of the public (drunks and drug users).
- Vehicle hazards associated with parks vehicles and travel to and from the site.
- Hazards associated with use of hand tools, such as pruner blades.
- Manual handling hazards associated with lifting.
- Thermal hazards associated with working outdoors in very hot and very cold weather.

You only need eight to get full marks.

2. a. **Explain** the meaning of the term 'dilution ventilation'. (2)

Dilution ventilation involves drawing air out of the workplace slowly, and replacing air removed with fresh air from an uncontaminated source. This can be done passively, by allowing air to freely circulate through open windows and doors, louvres and ventilation grilles. Or it can be done actively or mechanically by having fans which draw air out of a workroom, or blow air into a workroom, so that air is drawn in, or blown out, from outside.

2. b. **Outline** the circumstances in which the use of dilution ventilation may be appropriate. (6)

You could outline the following circumstances:

- The contaminant is not toxic at low concentrations.
- The contaminant is not generated quickly, but builds up gradually over a period of time.
- The contaminant is not generated at one particular point, but may be generated over a larger area or from several different sources.

- It is possible to dilute down the level of the contaminant to well below the WEL.
- If the WEL is approached, this will not have disastrous effects on health.

The simplest example to give is painting a room. If the windows and doors are all closed, the paint vapours build up and you get a headache after a few hours. If you open the windows and doors and encourage a through draught, the solvent vapours never build up to the same extent and you can finish the job headache-free.

1. **Outline** the factors to consider when making an assessment of first-aid provision in a workplace. (8)

You could include an outline of the following factors:

- Number of employees on site at any one time.
- Hazards present in the work.
- Risk profile of the workplace.
- Work patterns and shifts.
- Holidays and absences.
- Physical travel distances within/between workplaces.
- Geographic location relative to local A&E department.
- Presence of members of the public.

2. **Outline** FOUR types of engineering control that may be used to reduce noise in the workplace, giving a practical example of EACH. (8)

This question asks for an outline, so a brief explanation is required here. The question also asks for an example, so a practical situation has to be outlined for each of the four control options in order to win full marks.

The four options are:

- **Planned preventative maintenance** - carrying out scheduled maintenance to inspect, repair, replace and lubricate machinery that may be producing the noise. For example, PPM on a compressor used on a building site.
- **Balance machinery** - balance rotating parts of machinery so that violent vibration is minimised, which then puts noise into the workplace. For example, balancing the flywheel on a power press.
- **Silencing** - fitting silencers on the exhaust pipes of combustion engine or the exhaust ports of compressed air systems. For example, fitting a silencer to the exhaust pipe of a diesel generator.
- **Isolation** - mounting a noisy piece of machinery on anti-vibration legs, supports or matting to minimise the amount of vibration transmitted from the machine into surrounding supporting structures. For example, mounting a CNC grinding machine on anti-vibration matting on a factory floor.

1. **Outline TWO reactive** measures and **TWO proactive** measures that can be used in monitoring an organisation's health and safety performance. (8)

You could outline the following reactive measures:

- Accident or near-miss investigation reports and outcomes.
- Near-miss reporting statistics.
- Accident statistics.
- Ill-health statistics.
- Return-to-work statistics.

You could outline the following proactive measures:

- H&S inspection reports and outcomes.
- Safety sampling statistics.
- Safety audit reports.
- Safety representative inspection reports.
- Achievement of corrective actions.

You only need to outline two from each category.

2. For each of the following types of non-ionising radiation, **identify** a source and state the possible ill-health effects on exposed individuals:

a. Infrared radiation

There are lots of possible sources of infrared radiation. You should have ensured that your source was clearly work-related (i.e. occupational). Sources could include: welding equipment, furnaces, oxyacetylene cutting equipment, red hot/white hot metal or glass, ovens, fires (e.g. as encountered by fire-fighters occupationally).

Ill-health effects could include: skin burns, reddening of the skin, cataracts, dehydration, heat stress and heat stroke.

b. Ultraviolet radiation.

There are also lots of sources of ultraviolet radiation that might be encountered occupationally: the sun, very significant for anyone who works outdoors; welding equipment; certain types of light, mercury vapour lamps in particular; tanning beds; UV sterilising equipment.

Ill-health effects could include: skin burns and reddening of the skin; eye damage, burns to the surface of the eye accompanied by temporary blindness, arc-eye or snow-blindness; premature skin ageing and skin cancer or melanoma.

1. **Outline** the details to be recorded in an accident book following a workplace accident. (8)

Details include:

- Name and address of the injured person.
- Date and time of the accident.
- Exact location of accident (including address if not onsite).
- Nature of injury caused.
- Type of accident; Cause of accident;.
- Details of person completing the accident book.

2. **Outline** the precautionary measures to be taken to avoid accidents involving reversing vehicles within a workplace. (8)

You could have outlined some of the following:

- Induction training and refresher training for all pedestrians.
- Training and refresher training for vehicle drivers.
- Toolbox talks for drivers.
- Signs posted at appropriate places warning of reversing vehicle risk.
- Fixed mirrors at appropriate locations within the workplace to aid reversing drivers.
- No-go areas for pedestrians - either permanent or temporary.
- Use of trained banksmen to see back vehicles.
- Incorporation of one-way systems to eliminate the need for vehicle reversing.
- Use of barriers to segregate pedestrians from vehicle routes.
- Incorporation of safety havens and escape routes for pedestrians in vehicle reversing bays and loading bays.

1. **Explain** why personal protective equipment (PPE) should be considered as a last resort in the control of occupational health hazards.

An explanation of the following points should presented:

- It is preferable to protect groups of people through collective protection, rather than relying on each person protecting themselves with PPE.
- The most effective control option is hazard removal or the modification of the hazard to reduce the risk presented. This tackles the source of the problem. PPE does not do this; no attempt is made to eliminate or reduce the hazard at source.
- PPE is often unpopular for a variety of reasons with the workers who have to wear it. Consequently it may not be worn at all, or it may not be worn at all times or in the correct way. The hazard has not been tackled by other more appropriate means, so is still present to cause injury on these occasions.
- PPE may not fit correctly, because of poor selection or lack of user training. This may compromise its proper functioning.
- Even if a hazard cannot be eliminated or reduced at source, there are other, more effective ways of protecting workers. Machine guards to prevent access to dangerous moving parts are an example of this.
- If PPE fails it fails to a situation of danger.
- To be effective PPE relies on safe behaviours and these are often the hardest aspect of the safety performance of an organisation to get right. For instance, people have to wear the right item of PPE, the right way, in the right circumstances all of the time and they should do so in the absence of supervision because they know it is the right thing to do and they want to do it.

2. a. **Describe** the possible effects of electricity on the body. (4)

You could have described some of the following:

- Painful sensations.
- Muscle spasms.
- Lock on and the inability to let go.
- Respiratory failure.
- Ventricular fibrillation.
- Cardiac arrest.
- Burns to the skin.
- Internal burns.

You might have pointed out that these occur at different current flows, and that the more serious effects occur at higher current flow through the body at 80 mA and upwards.

2. b. **Outline FOUR** factors that may influence the severity of injury from contact with electricity. (4)

You might have outlined some of these factors:

- Pathway taken by the current.
- Duration of contact.
- Surface area of skin contact.
- Thickness of the skin.
- Clothing worn.
- Voltage of the system.
- Environmental factors such as type of floor surface and presence of water.

1. Give reasons why a health and safety committee may prove to be ineffective in practice. (8)

Possible ideas might include:

- No agenda.
- Poor chairperson.
- Lack of training for attending managers.
- Lack of training for attending safety representatives.
- Poorly defined terms of reference for the committee.
- Meetings held too infrequently.
- Insufficient time allocated for meetings.
- Wrong people attending.
- No-one with authority present in meeting.
- No budget allocation, money to spend.
- Militancy from either or both parties.
- No minutes taken.

2. a. **Describe** the differences between acute and chronic health effects. (4)

Acute - come on quickly after exposure; they are short-lived effects that wear off with time and do not recur. For example, alcohol and inebriation followed by a hang-over.

Chronic - tend to come on gradually over a long period of time, usually in response to repeated exposures at low doses. The health effect stays in the long term and may last a lifetime. The effect may gradually worsen, or symptoms may disappear, if exposure to the causative agent stops, but may recur periodically in the future. For example, alcohol and long-term cirrhosis of the liver.

2. b. **Identify** the factors that could affect the level of harm experienced by an employee exposed to a toxic substance. (4)

You could have described some of the following:

- Toxicity of the substance.
- Physical state and form of the substance.
- Possible routes of entry.
- Concentration of the substance present in the workplace.
- Time of exposure.

- Dose received.
- Personal susceptibility of the exposed person to the substance.
- Use of PPE.

1. **Outline** the factors that may determine the level of supervision an employee should receive during their initial period within a company. (8)

Possible ideas might include:

- The hazards of the job.
- The "visibility" of the hazards - how obvious they are.
- The risk level.
- Complexity of the task.
- How critical it is to stick to the safe system.
- How others may be affected by their actions.
- Competence of other employees working alongside them.
- Their training and education.
- Previous experience.
- Intellectual ability.
- Aptitude for the work.
- Their physical and mental maturity.
- Vulnerable group - young person, expectant mother, etc.

You could have structured your answer along these lines - the job and the employee.

2. a. **Explain** the health and safety benefits of restricting smoking in the workplace. (4)

Your answer might have included:

- Health benefits for the individual, including reduced risk of heart disease and respiratory disease, as well as enhanced feeling of well-being.
- Benefits for the organisation in terms of reduced absence due to smoking-related conditions, and a more able worker.
- Increased life expectancy and prolonged working life.
- Elimination of a potential ignition source from most areas of the workplace and, therefore, reduction of fire risk.
- Reduction in the number of complaints about passive smoking by non-smokers.

- Defence of claims for compensation based on smoking related ill-health in non-smokers resulting from passive smoking.

b. **Outline** the ways in which an organisation could effectively implement a no-smoking policy. (4)

Your answer might have included:

- Clear policy development.
- Consultation on policy formulation.
- Clear timetable for policy implementation.
- Effective communication at every stage.
- Openness and honesty about intent, reasons and problems expected.
- Effective resolution of complaints and issues raised by those affected.
- Consistent message.
- No backtracking.

1. **Explain** why personal protective equipment (PPE) should be considered as a last resort in the control of occupational health hazards. (8)

You might have started your answer with an explanation of what a typical hierarchy of control measures looks like, followed by an explanation of the benefits of hazard elimination, substitution, etc.

Your answer might also have discussed some of the inherent problems associated with PPE that put it at the bottom of the hierarchy:

- Only protects one person.
- Only protects if it is worn properly.
- Difficulties with fit, practicalities of use, ergonomics, etc.
- Difficulties with enforcement of use.
- Other on-going management issues such as training, replacement, repair.

You might also have included reference to the desirability of technical controls over and above procedural and behavioural controls. This could have been linked into the Principles of Prevention listed in Schedule 1 of the Management Regulations.

2. Other than those associated with the physical environment, **outline EIGHT** possible causes of increased stress levels amongst employees. (8)

Your answer might have included:

- Increased workload, and very short deadlines.
- The introduction of new jobs and tasks without adequate support & training.
- Longer hours of work.
- Changing or inflexible working patterns.
- Organisational change such as threat of closure, redundancies, downsizing, reorganisation, merger.
- Changes of management.
- The replacement of challenging work with dull, routine work.
- Loss of clear, well communicated direction and targets.

1. **Outline** the key points that should be covered in a training session for employees on the reporting of accidents/incidents. (8)

Your answer might have included reference to the following points:

- Company policy.
- Definitions of various words - accident and near-miss.
- Explanation of the accident triangle.
- The reasons for reporting.
- Reporting procedures.
- Use and location of reporting forms.
- Responsibilities.
- Legal background - RIDDOR.
- How reports are followed up.
- Action taken against those who fail to report.

2. **Outline EIGHT** precautions that should be considered to prevent accidents to children who might be tempted to gain access to a construction site. (8)

Your answer might have included:

- Use of perimeter fences to prevent access.
- Security guards - either roving or permanent.
- CCTV.
- Adequate lighting at night-time.
- Routine inspections looking for evidence of entry or attempted entry.
- Hazard awareness campaign at local schools.
- Awareness letter to local residents, especially parents.
- Covering or barriering excavations.
- Removal of means of access to scaffolds.
- Securing plant against unauthorised use.
- Securing hazardous chemicals in appropriate storage.
- Routine housekeeping.

Identify the *direct* and *indirect* costs, to the employer, of accidents at work. (8)

Direct costs are those that can be directly linked to a particular event and tend ot be known figures such as:

- The cost of any absence experienced by the injured employee.
- The cost of repairing machinery damaged in the event, or replacing damaged machinery or equipment.
- The cost of the first aider who gave treatment to the injured employee and the materials they may have used in giving treatment.
- The cost of product that may have been damaged / destroyed in the accident
- The cost of the clean-up operation immediately after the accident, including the labour involved and any materials used.

Indirect costs are those costs that cannot be directly attributed to the event. They have occurred, perhaps in part because of the accident and perhaps at some stage later on. They may be linked to the accident but may be impossible to assign a particular cash value. Such as:

- The cost of an increase in insurance premiums because of increased claims for compensation.
- The cost of lost sales as a result of shorting an order or missing a deadline because of the accident.
- The cost of lost sales to customers as a result of poor publicity associated with the accident.
- Costs associated with high staff turnover and difficulty recruiting because of bad publicity.
- Costs associated with loss of contracts and client confidence associated with the accident.

2. **Outline** the **FOUR** main categories of guards and safe-guarding devices that may be used to minimise the risk of contact with dangerous parts of machinery. (8)

This question can be answered by reference to the hierarchy of guards:

- Fixed guards.
- Other guards, which would include interlocked guards and adjustable guards.
- Protective devices, which would include tripwires, pressure mats and photo-electric devices (light guards).
- Protective appliances - push sticks and clamps.

Each of these categories would need to be described in brief detail (outline).

1. (a) **Explain** the meaning of the term "competent person". (2)

Your answer should make use of a widely accepted definition of the phrase - such as a combination of training, experience, knowledge and other qualities. But note that you should explain what this means - not just quote a short definition.

(b) **Outline** the organisational factors that may cause a person to work unsafely even though they are competent. (6)

Organisational factors might include ideas such as:

- Unrealistic deadlines leading to short cuts.
- Lack of supervision.
- Failure to provide the right tools or equipment to do the job safely.
- A lack of formalised procedures or safe systems of work.
- Unnecessarily complex or onerous procedures or safe systems of work.
- Peer group pressure.
- A lack of visible management commitment or, even worse, poor compliance by management with the safe way of working.
- Poor working patterns and hours of work leading to fatigue.

Note that this question asks for organisational factors, so discussing personal factors that relate to the characteristics of the individual worker will be a waste of your time.

Note also that the question clearly states that the person is competent - so obviously they have the appropriate training, experience, knowledge, etc., so discussing the lack of training provision will also be a waste of your time.

2. **List EIGHT** features of a safe means of escape from a building in the event of a fire. (8)

- Must be available for all people in a building whenever they are present, i.e. available to all.
- Must be unobstructed.
- Must be suitably lit, including by emergency lighting where necessary.

- Must be appropriately signed.
- Must end at a place of safety - at ground floor so that people can leave the vicinity of the building.
- Must be wide enough to accommodate the numbers and types of person who might need to use it.
- Must not include lifts or other devices where people are not moving by their own unaided efforts (except in certain cases such as a firefighters' lift).
- Must be sufficient in number to allow the number of people anticipated to escape in a reasonable time.
- Must not require people to re-enter a burning building.
- Must be adequately protected from fire and smoke.

No explanation required - list.

1. **Give reasons why** a verbal instruction may not be clearly understood by an employee. (8)

Reasons might include ideas such as:

- Language barrier because one or both parties do not speak the language.
- Heavy regional accent or dialect.
- Background noise.
- Other environmental factors interfering with the ability of the employee to concentrate, such as extreme cold.
- Distractions such as visual aids given out whilst instruction being given, or interesting things going on in the environment.
- Use of technical jargon.
- Speed of delivery not matched to the rate of comprehension of the receiver.
- Mental ability of the receiver is overestimated by the instructor and no attempt is made to verify comprehension.
- Failure to emphasise key instructions included in a lot of superfluous information - information overload.
- Hearing difficulty or deafness.
- Failure to pay attention due to poor attitude.

2. (a) **Describe**, by means of a labelled sketch, a chemical indicator (stain detector) tube suitable for atmospheric monitoring. (4)

You should have drawn a sketch of a graduated glass tube sticking out of a hand pump. The tube should have been labelled with the following: Tube; crystals; graduations; broken end to allow air flow; number of strokes on hand pump; direction of air flow arrow.

(b) **List** the main limitations of a chemical indicator (stain detector) tube. (4)

- Takes a spot sample or grab sample, not an average concentration across periods of time.
- Inherently inaccurate.

- Temperature-sensitive (though this can be corrected for).
- Subject to user error (for example, the number of strokes on the hand pump may be miscounted).
- Introduces the additional hazards of broken glass and tube disposal.
- May not be a tube sensitive to the gas or vapour in question.
- Tubes may be cross-sensitive (i.e. another chemical gives a positive result in place of the chemical being tested for).

1. **Identify FOUR** different types of hazard that may necessitate the use of special footwear, explaining in **EACH** case how the footwear affords protection. (8)

There are lots of potential answers to this question.

Your answer should have dealt with four hazards and each hazard should have been sufficiently different (e.g. high temperatures, corrosive chemicals, falling objects and slippery floors; rather than four hazards which are all similar such as corrosive chemicals, irritant chemicals, toxic chemicals, etc.).

Your answer should clearly have explained how each type of PPE works. For example, a steel toe-cap boot works by providing an inbuilt shield that protects the toes from falling objects or crush injuries. It is not enough simply to name the item of PPE. You must explain how it works.

2. **Outline** the means of controlling exposure to ionising radiation. (8)

Time - minimise the duration of exposure on the basis that dose received is directly related to length of time of exposure. So ionising radiation sources should only be used for the shortest duration of time possible.

Distance - increase distance from the radiation source on the basis that most particle forms of radiation cannot travel very far through air and electromagnetic forms are subject to the inverse square law. So alpha particles will only travel a few centimetres through air. Beta particles will travel a few feet. X-rays and gamma rays will travel much longer distances through air (tens of kilometres) but the dose of radiation falling on a surface falls very dramatically as the distance from the source increases. So unauthorised personnel should not be allowed into controlled areas and authorised workers should keep as far away from radiation sources as is practically necessary.

Shielding - all forms of ionising radiation have the power to penetrate through matter, but to varying degrees. Alpha particles are not very penetrating, so can be stopped by one piece of paper. Beta particles are slightly more penetrating but can be stopped by a sheet of tin foil. X-rays and gamma rays are far more

penetrating, so thicker, denser materials have to be used for containment - such as lead or thick concrete.

International standards recognise dose limits that need to be observed in the workplace. Where workers might be exposed to significant fractions of these dose limits the employer will have to restrict access to those work areas to authorised radiation workers only and will have to carry out dosimetry so as to make a reliable estimate of worker's exposure.

The employer will also need to ensure that emergency arrangements exist to deal with accidental releases of radiation sources.

1. **Outline** the reasons why an organisation should review and monitor its health and safety performance. (8)

Your answer should include an outline of the following reasons:

- To meet implicit legal requirements (statute law will vary depending on region; e.g. Health and Safety at Work Act in the UK).
- To find out if legal standards are being met.
- For continuous improvement.
- If it is not monitored then it cannot be managed.
- To see what is working well and what needs attention.
- To decide on the allocation of resources.
- To see if the organisation's aims and objectives are being met.
- To control costs associated with poor performance.
- To control the business risk associated with H&S liabilities.

2. **Outline** the precautions to be taken when using a mobile elevated working platform (MEWP) to reach a high point such as a streetlight. (8)

- On firm, stable ground.
- Outriggers used if fitted.
- Area cordoned off.
- Hard hats worn by all in area.
- Trained and competent operator.
- Safe working load (SWL) observed.
- MEWP not moved in elevated position unless designed to do so.
- Harnesses and anchored lanyards used.
- Keys removed from MEWP when not in use.
- Safe access to working platform available inside the structure, not by climbing up the outside.
- Emergency arrangements in place (e.g. self rescue if platform becomes stuck).

List the written information that is likely to be examined during a health and safety audit. (8)

- H&S policy document; all three sections.
- Accident reports and accident investigation records.
- Maintenance records, in particular relating to safety critical equipment.
- Training records relating to H&S, e.g. induction training.
- H&S inspection reports
- Minutes of H&S consultation meetings.
- Letters exchanged with enforcement authorities.
- Risk assessment documents.
- Internal H&S performance monitoring reports such as accident statistics.
- Issue records for safety equipment such as PPE

2. (a) **List FOUR** respiratory diseases that could be caused by exposure to dust at work. (4)

- Asthma.
- Asbestosis.
- Silicosis.
- Mesothelioma.
- Lung cancer.

(Only four needed.)

(b) **Identify** the possible indications of a dust problem in a workplace. (4)

- Dust observable in the air.
- Dust observable on surfaces such as walls, floor and overheads.
- Dust contamination observable on workers and their clothing.
- Workers coughing and sneezing.
- Ill-health records show high incidence of respiratory complaints.
- Complaints from workers.
- Excessive use of respiratory protective equipment (RPE).

1. Most occupational accidents can be attributed in part to human error. **Outline** ways of reducing the likelihood of human error in the workplace. (8)

Your answer might include an outline of the following ideas:

- Information, instruction and training.
- Adequate supervision.
- Double-checking and cross-checking.
- Allocation of realistic workload and deadlines.
- Documented and displayed safe systems of work.
- Use of signs.
- Use of visible and audible alarms.
- Good ergonomic design of workstations.
- Drugs and alcohol policy.
- Appropriate lighting.
- Removing or reducing distractions.

2. (a) **Outline** the symptoms of Vibration-Induced White Finger (VWF). (2)

- Blanching of the fingers followed by reddening some time later (with pain).
- Numbness and tingling sensations.
- Loss of grip and dexterity.

(b) **Identify** the possible control measures that might reduce employee exposure to hand-held vibrating tools. (6)

- Total elimination by use of different work method.
- Automation or mechanisation.
- Use of alternative work method that involves less use of vibration.
- Replacement of tool with low-vibration version.
- Use of jigs, clamps, counterweights to reduce the need to grip tool.
- Anti-vibration handles.
- Minimising duration of use; job rotation.
- Information, instruction and training.

1. (a) **Give TWO** examples of a confined space. (2)

- Flour or grain silo and
- Fuel storage tank.
- Deep excavation or
- Sewer.

(Only two required.)

(b) **Outline** specific hazards associated with working in confined spaces. (6)

Your answer might include an outline of the following ideas:

- Fire and explosion due to flammable materials in the space, taken into the space, or seeping into it.
- Lack of oxygen.
- Asphyxiant gases such as carbon monoxide or carbon dioxide.
- Entrapment in free-flowing solids such as grain.
- Drowning in liquids.
- Overheating.
- Mechanical hazards associated with machinery and moving parts in the space.
- Electricity.

2. (a) **Identify** the possible effects on health that may be caused by working in a hot environment such as a foundry. (2)

- Dehydration (caused by water loss through sweating).
- Cramps (caused by salt loss through sweating).
- Heat stress (raising of core body temperature above normal).
- Heat stroke (passing out, leading to coma and death).

(b) **Outline** measures that may be taken to help prevent the health effects identified in (a). (6)

- Ventilation with fresh or chilled air and creation of air movement to optimise evaporative cooling effect.

- Appropriate clothing.
- Shielding workers from radiant heat sources.
- Lagging of hot parts where possible.
- Job rotation and frequent breaks.
- Easy access to drinking water.
- Salt tablets.
- Cool-down refuges or havens.
- Acclimatisation of new workers into hot areas.
- Training and information.
- Health surveillance.